Study for the Ongoing Assessment of Falls of the Neuse Reservoir
2011 Results

Purpose

The objective of this study is to evaluate progress in attainment of water quality standards and use support in Falls of the Neuse Reservoir (Falls Lake) as required by the Falls water supply nutrient strategy (15A NCAC 02B.0275). Data for load reduction estimates are not part of this particular study. This report summarizes sample results collected in 2011.

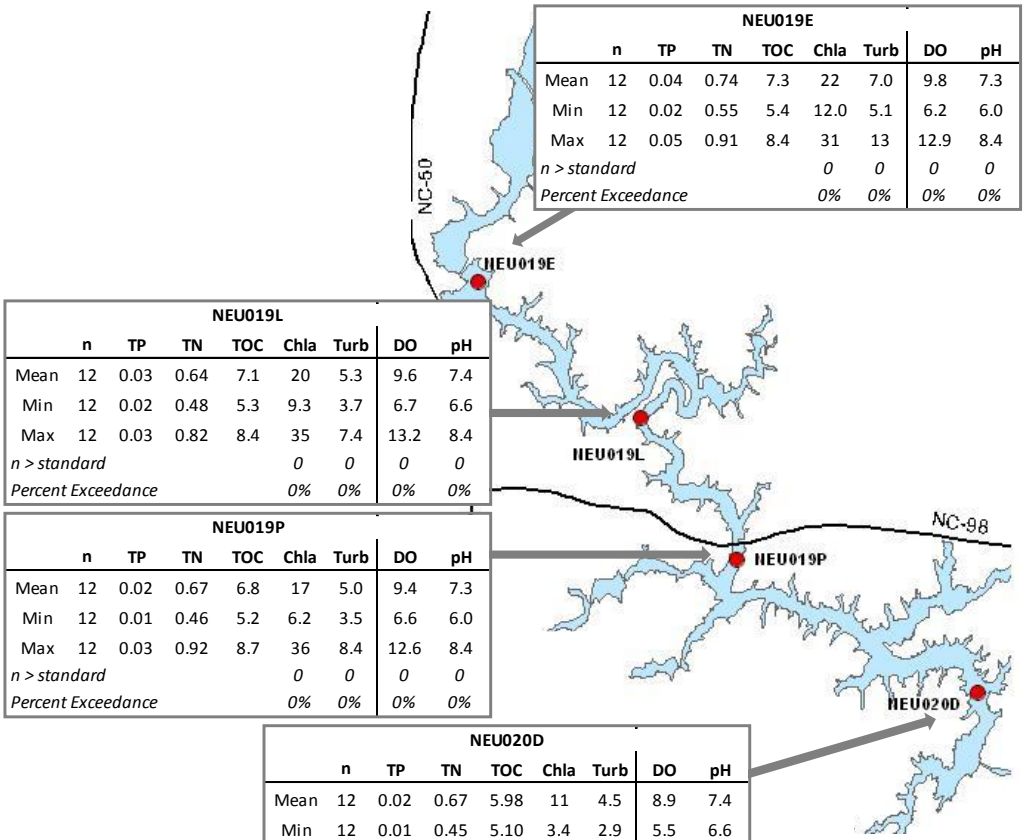
Methods

A detailed study plan can be found at http://portal.ncdenr.org/web/wq/ess/isu. This study has 11 stations that were sampled monthly for one year. On April 7, 2011 total organic carbon (TOC) sampling and station LI01 were added to the sampling plan. Chemical samples were collected from the photic zone and analyzed for total phosphorus (TP), total nitrogen (TN), TOC, ammonia (NH_3), nitrate + nitrite (NO_3+NO_2), total Kjeldahl nitrogen (TKN), turbidity, and chlorophyll *a* (Chla). Duplicate samples were collected at one station per sampling event on a rotating schedule. Results for each duplicate station were averaged and used as a single result for data analyzed in 2011. Physical measurements of dissolved oxygen (DO), temperature, pH and conductivity were collected through the water column in one meter (m) increments with a mulitparameter meter.

Results

Results are presented by station in the two management areas, Lower Falls Lake (Figure 1) and Upper Falls Lake (Figure 2). These figures show annual mean (average), minimum and maximum concentrations for TP, TN, TOC (mg/L), Chla (µg/L), and turbidity (NTU) from the photic zone; DO (mg/L) and pH (s.u.) from a depth of 0.15 m (surface sample). Data summaries are calculated from twelve sampling events (n = 12), except at LI01 and TOC data where n =8. Percent exceedance of state water quality standards are shown for each station during the 2011 sampling. All nitrate + nitrite and ammonium data below detection (< 0.02 mg/L) were entered as 0.01 mg/L in order to calculate TN values.

Figure 2. Lower Falls Lake 2011 Results.



NEU019E

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.04	0.74	7.3	22	7.0	9.8	7.3
Min	12	0.02	0.55	5.4	12.0	5.1	6.2	6.0
Max	12	0.05	0.91	8.4	31	13	12.9	8.4
n > standard					*0*	*0*	*0*	*0*
Percent Exceedance					*0%*	*0%*	*0%*	*0%*

NEU019L

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.03	0.64	7.1	20	5.3	9.6	7.4
Min	12	0.02	0.48	5.3	9.3	3.7	6.7	6.6
Max	12	0.03	0.82	8.4	35	7.4	13.2	8.4
n > standard					*0*	*0*	*0*	*0*
Percent Exceedance					*0%*	*0%*	*0%*	*0%*

NEU019P

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.02	0.67	6.8	17	5.0	9.4	7.3
Min	12	0.01	0.46	5.2	6.2	3.5	6.6	6.0
Max	12	0.03	0.92	8.7	36	8.4	12.6	8.4
n > standard					*0*	*0*	*0*	*0*
Percent Exceedance					*0%*	*0%*	*0%*	*0%*

NEU020D

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.02	0.67	5.98	11	4.5	8.9	7.4
Min	12	0.01	0.45	5.10	3.4	2.9	5.5	6.6
Max	12	0.04	0.85	7.00	22	8.3	12.6	8.4
n > standard					*0*	*0*	*0*	*0*
Percent Exceedance					*0%*	*0%*	*0%*	*0%*

Figure 2. Upper Falls Lake 2011 Results.

NEU013

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.16	1.59	9.28		53	9.3	7.8
Min	12	0.08	0.98	8.40		21	6.0	6.8
Max	12	0.26	2.21	11.00		110	13.5	9.4
n > standard					*N/A*	*10*	*0*	*1*
Percent Exceedance					*N/A*	*83%*	*0%*	*8%*

NEU013B

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.12	1.30	8.9	53	36	9.6	7.7
Min	12	0.07	0.92	7.2	16	19	5.9	6.2
Max	12	0.17	1.85	10.0	92	56	13.6	10.0
n > standard					*8*	*9*	*0*	*1*
Percent Exceedance					*67%*	*75%*	*0%*	*8%*

LLC01

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	11	0.06	0.87	7.5	29	11	10.3	7.7
Min	11	0.04	0.71	6.8	6	5.9	5.9	6.5
Max	11	0.09	1.11	9.0	66	20	12.7	9.1
n > standard					*2*	*0*	*0*	*1*
Percent Exceedance					*18%*	*0%*	*0%*	*9%*

NEU0171B

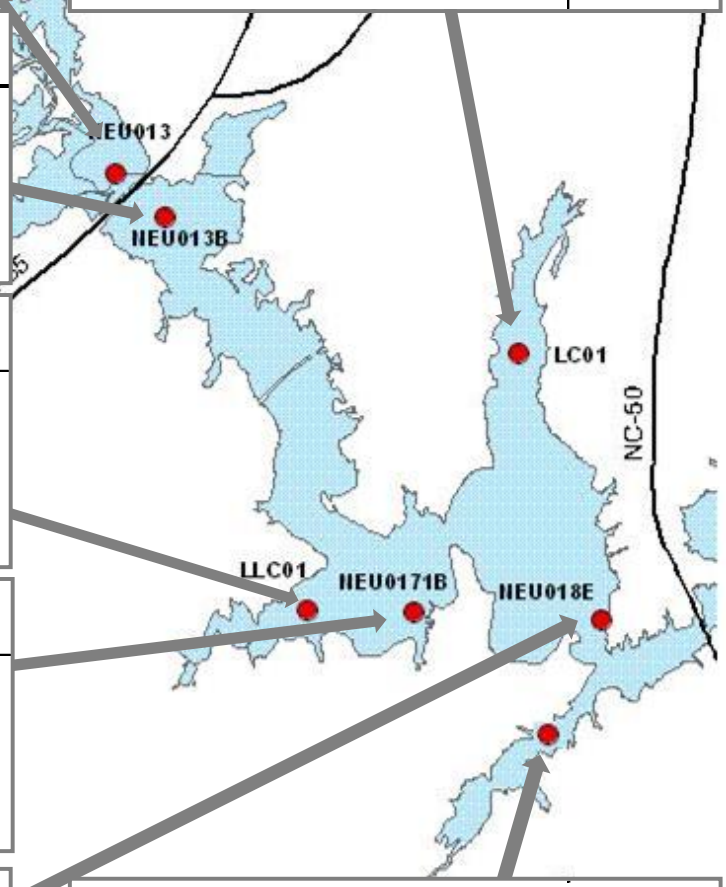
	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.05	0.82	7.4	26	11	10.2	7.7
Min	12	0.03	0.73	6.2	6	8.2	6.6	6.7
Max	12	0.08	1.01	9.2	50	18	12.4	8.9
n > standard					*2*	*0*	*0*	*0*
Percent Exceedance					*17%*	*0%*	*0%*	*0%*

NEU018E

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	12	0.04	0.74	7.30	23	7.2	10.1	7.8
Min	12	0.03	0.62	5.80	6	3.7	6.7	6.8
Max	12	0.05	0.92	8.60	44	9	12.4	8.9
n > standard					*1*	*0*	*0*	*0*
Percent Exceedance					*8%*	*0%*	*0%*	*0%*

LC01

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	11	0.04	0.77	7.6	20	10	9.7	7.4
Min	11	0.03	0.58	6.3	5.5	6.7	5.4	6.4
Max	11	0.07	1.01	10.0	44	16	12.3	8.3
n > standard					*1*	*0*	*0*	*0*
Percent Exceedance					*9%*	*0%*	*0%*	*0%*



LI01

	n	TP	TN	TOC	Chla	Turb	DO	pH
Mean	8	0.05	0.78	7.5	26	10	9.3	7.7
Min	8	0.03	0.66	6.0	13	6.2	6.0	6.6
Max	8	0.06	0.95	9.2	45	18	11.2	8.9
n > standard					*1*	*0*	*0*	*0*
Percent Exceedance					*13%*	*0%*	*0%*	*0%*